



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/907,001	07/16/2001	Thomas D. Yager	VGEN.P-015-DV-2	8061

57600 7590 02/01/2006

HOLLAND & HART LLP
60 E. SOUTH TEMPLE
SUITE 2000
SALT LAKE CITY, UT 84111

EXAMINER

BARTON, JEFFREY THOMAS

ART UNIT	PAPER NUMBER
----------	--------------

1753

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

y

Interview Summary	Application No. 09/907,001	Applicant(s) YAGER ET AL.	
	Examiner Jeffrey T. Barton	Art Unit 1753	

All participants (applicant, applicant's representative, PTO personnel):

(1) Jeffrey T. Barton. (3) _____.

(2) Christopher Wight. (4) _____.

Date of Interview: 20 January 2006.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☒ Yes e) ☐ No.

If Yes, brief description: Draft amendment, see attached.

Claim(s) discussed: _____.

Identification of prior art discussed: Clark et al, Soane et al.

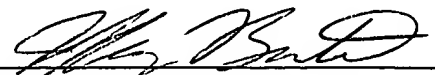
Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: See Continuation Sheet.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.


Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Mr. Wight sent the Examiner a copy of a draft amendment, and the implications of proposed new claim language relative to the prior art of record was discussed. The Examiner indicated that entry of an after-final amendment with new limitations requiring further search and/or consideration would not be possible. The Examiner also indicated that it appeared that the electrode geometry described in Table 2 on page 7 of the draft amendment might be different than those described by Soane et al and Clark et al.

DRAFT AMENDMENT - FOR DISCUSSIONS PURPOSES ONLY

*Reply Under 37 CFR 1.116
Expedited Procedure
Technology Center 1700*

PATENT
Attorney Docket No. 49493.0105

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Yager et al.

Application No.: 09/907,001

Filed: July 16, 2001

For: MICRO-ELECTROPHORESIS CHIP FOR
MOVING AND SEPARATING NUCLEIC ACIDS
AND OTHER CHARGED MOLECULES

Examiner: Jeffrey T. Barton

Art Unit: 1753

AMENDMENT AFTER FINAL REJECTION

Mail Stop AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following amendments and remarks are filed in response to the Final Office Action mailed August 3, 2005, the six-month statutory period for response to which expires on **February 3, 2006**.

A three-month extension of time, extending the period of response to February 3, 2006, is filed concurrently with this response.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks/Arguments begin on page 5 of this paper.

IN THE CLAIMS:

Claims 1, 29, 35 and 37 have been amended. Applicant requests that the amendments be entered. All claims currently pending and under consideration in the referenced application are shown below. This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-23. (Canceled)

24. (Previously Presented) A method for manufacturing a microelectrophoresis chip, comprising:

- (a) forming a mold using lithography, the mold being the reverse of a desired pattern of one or more channels, each channel having a central region between two edges;
- (b) casting or imprinting the channels in a polymeric substrate as a negative impression replica of the mold;
- (c) fusing the polymeric substrate with the channels formed therein to a solid support;
- (d) forming a plurality of electrodes within each channel, wherein at least one cathode or anode is disposed in the central region of a channel, and wherein the electrodes are positioned in a spatially-dispersed array consisting of an extended series of three or more electrodes capable of generating an electric field in a first direction and an extended series of three or more electrodes capable of generating an electric field in a second direction.

25. (Previously Presented) The method for manufacturing a microelectrophoresis chip according to claim 24, wherein each channel is from 1 to 10 μ m in depth.

26. (Previously Presented) The method for manufacturing a microelectrophoresis chip according to claim 24, wherein the chip has a plurality of channels.

27. (Canceled)

28. (Previously Presented) The method for manufacturing a microelectrophoresis chip according to claim 24, wherein the plurality of anodes and the plurality of cathodes are disposed to generate electric fields in at least two non-parallel directions.

29. (Previously Presented) A method for manufacturing a microelectrophoresis chip, comprising:

(a) forming a mold using lithography, the mold being the reverse of a desired pattern of one or more channels, each channel having a central region between two edges;

(b) casting or imprinting the channels in a polymeric substrate with a first major surface as a negative impression replica of the mold;

(c) fusing the polymeric substrate with the channels formed therein to a solid support;

(d) forming a plurality of electrodes within each channel, wherein at least some anodes or cathodes are disposed in the central region of a channel such that the electrodes can generate electric fields in at least two non-parallel directions within a plane parallel to the first major surface of the substrate, and wherein the electrodes are positioned in a spatially-dispersed array consisting of an extended series of three or more electrodes capable of generating an electric field in a first direction and an extended series of three or more electrodes capable of generating an electric field in a second direction.

30. (Previously Presented) The method for manufacturing a microelectrophoresis chip according to claim 29, wherein each separation channel is from 1 to 10 μ m in depth.

31. (Previously Presented) The method for manufacturing a microelectrophoresis chip according to claim 29, wherein the chip has a plurality of separation channels.

32. (Canceled)

33. (Canceled)

34. (Previously Presented) The method for manufacturing a microelectrophoresis chip according to claim 24, further comprising filling each channel with a homogeneous separation medium including water soluble fullerenes.

35. (Currently Amended) The method for manufacturing a microelectrophoresis chip according to claim 24, further comprising filling each channel with a homogeneous separation medium including ~~self-assembly dendrimers~~ self-assembling dendrimers.

36. (Previously Presented) The method for manufacturing a microelectrophoresis chip according to claim 29, further comprising filling each channel with a homogeneous separation medium including water soluble fullerenes.

37. (Currently Amended) The method for manufacturing a microelectrophoresis chip according to claim 29, further comprising filling each channel with a homogeneous separation medium including ~~self-assembly dendrimers~~ self-assembling dendrimers.

REMARKS/ARGUMENTS

This amendment after final rejection is submitted pursuant to 37 C.F.R. § 1.116, in response to the Final Office Action mailed August 3, 2005. Claims 24-26, 28-31 and 34-37 are currently pending in the application. Claims 24-26, 31 and 34-37 stand rejected. Claims 35 and 37 have been objected to because the term, “self-assembly dendrimers” is awkward.

Applicants have amended claims 1, 29, 35 and 37. Applicant respectfully submits that these amendments are responsive to the outstanding rejections and place the claims in condition for allowance, for reasons explained in detail below. In view of the above amendments to the claims, Applicant respectfully requests reconsideration of the application as amended herein.

Objection to Claims 35 and 37

Claims 35 and 37 have been objected to because the term, “self-assembly dendrimers” is awkward. Claims 35 and 37 have been amended to change the term “self-assembly dendrimers” to “self-assembling dendrimers.”

Obviousness Rejections under 35 U.S.C. § 103(a)

Claims 24, 25, and 28-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Soane et al. (U.S. Patent No. 5,135,627) in view of either Ekström et al. (U.S. Patent No. 5,376,252) or Kaltenbach et al. (U.S. Patent No. 5,500,071). Dependent claims 26-27 and 34-37 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over these same references, further in view of one or more of Sethi et al. (U.S. Patent No. 4,891,120), Jinno et al. Ross et al., Tanaka et al. and Newkome et al.

Claims 24-26 and 28-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Clark et al. (U.S. Patent No. 5,194,133) in view of either Ekström et al. (U.S. Patent No. 5,376,252) or Kaltenbach et al. (U.S. Patent No. 5,500,071). Claims 34-37 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over these same references, further in view of one or more of Jinno et al., Ross et al., Tanaka et al. and Newkome et al.

The above rejections are based largely on the teachings of Soane et al. and Clark et al., both of which disclose electrophoretic devices having an extended series of electrodes along opposing sides of an electrophoretic channel. The examiner also notes that Soane et al. discloses an electrode that circumscribes the top, bottom and sides of the channel, in the form of a plate through which a tubular electrophoretic channel passes. The following Table 1, with each cell representing a distinct electrode, illustrates how such an array in a single channel would appear:

Table 1

1	2
3	4
5	6

Column 1 (cells 1, 3 and 5) represent the electrodes along one side of the channel, while Column 2 (cells 2, 4 and 6) represent electrodes along the opposite sides of the channel. The examiner states that the series of electrodes along the sides of the channel satisfies the claim limitation of “a plurality of electrodes within each channel, wherein at least one cathode or anode is disposed in the central region of a channel.” The examiner also states that the teaching in Soane et al. of an electrode that circumscribes the channel satisfies the claim limitation of an electrode “disposed in the central region of a channel.” Presumably, the examiner interprets the term “within” to mean anything between the sides of the channel, including the top or bottom of the channel.

Applicant respectfully traverses the above rejections, and submits that the meaning of the claims, as previously entered, have been misinterpreted by the examiner, resulting in an erroneous application of the prior art references. Specifically, the examiner has misinterpreted the meaning of Applicant’s claim limitation reciting an electrode “disposed *in the central region* of a channel.” In Applicant’s previous response, dated April 27, 2005, Applicant explained that the prior art references “show only electrodes that are disposed at the *edges* of a channel,” and that the electrodes of the present invention are “positioned *within* a separation channel” (emphasis added).

Applicant respectfully submits that this distinction still holds true. Although Soane et al. teaches an electrode that circumscribes a channel, such an electrode does not constitute a distinct electrode that is within the channel. The circumscribing electrode merely circumscribes *all edges* of the channel.

In an effort to more clearly and particularly define the novel aspect of the invention, Applicant has amended the two independent claims, claims 24 and 29, to recite that “the electrodes are positioned in a spatially-dispersed array consisting of an extended series of three or more electrodes capable of generating an electric field in a first direction and an extended series of three or more electrodes capable of generating an electric field in a second direction.” Applicant respectfully submits that the novel aspect of the claimed invention is that the electrodes are positioned in a spatially-dispersed array comprising electrodes within the field of migration not just in one direction, but in a plurality of directions. Thus, the invention provides for a plurality of electrodes *in one direction*, and a plurality of electrodes *in a second direction*. This arrangement of electrodes can perhaps best be envisioned geometrically as an array having at least three series of electrodes in one direction and three series of electrodes in a second direction. One particular embodiment of such a structure, for example, would be an array having three or more rows and three or more columns, as described in the following table, with each cell representing a distinct electrode:

Table 2

1	2	3
4	5	6
7	8	9

The array illustrated by the above in Table 2 has three rows and three columns. Column 1 (cells 1, 4 and 7) and column 2 (cells 2, 5 and 8) define a channel analogous to that described in Soane et al. and Clark et al., with each row representing opposing electrodes on opposite sides of the

channel. Amended claims 24 and 29, however, recite not only “an extended series of three or more electrodes capable of generating an electric field in a first direction,” but also “an extended series of three or more electrodes capable of generating an electric field in a second direction,” which limitation is not found in Soane et al. or Clark et al. The difference between the electrodes of Soane et al. and Clark et al., versus the electrode array of the present invention, is that the electrode array of the present invention includes not only the channel defined by columns 1 and 2 (i.e., “an extended series of three or more electrodes capable of generating an electric field in a first direction”), but also a second channel in a different direction, defined by row 1 (cells 1, 2 and 3) and row 2 (cells 4, 5 and 6) (i.e., “an extended series of three or more electrodes capable of generating an electric field in a second direction.”). This two-dimensional array, having at least three rows and three columns of electrodes, is disclosed, for example, in the specification in Figures 2A, 5, 6, 8A, 8B, 8C, 8D, 8E, and 10.

Neither Soane et al. nor Clark et al. disclose a series of arrays in a first direction and a second series of arrays in a second direction. Although Soane et al. and Clark et al. describe a series of electrodes in a first direction, which includes a central electrode, they do not disclose a series of electrodes in a second direction with a central electrode. The opposing electrodes on the sides of the channel disclosed by Soane et al. and Clark et al. do not satisfy the definition of “an extended series of three or more electrodes capable of generating an electric field in a second direction,” because the two opposing electrodes are not “an extended series,” and do not consist of “three or more electrodes.” Moreover, the circumscribing electrodes of Soane et al. define a single electrode (not an extended series of electrodes, as required by the claims). In addition, even though the circumscribing electrode surrounds the channel, it is capable of only a single charge at any given moment, and can only generate an electrical field in a single direction (not a second direction, as required by the claims). The functional distinction, which gives rise to the advantages of the present invention that are not found in the prior art references, is that molecules of interest are capable of migrating past the centrally located electrode in *multiple* directions, whereas the prior art allows migration past a centrally located electrode in only a *single* direction. It is this feature that defines this novel aspect of the invention.

For purposes of clarification, Applicant’s previous argument that the electrode array of the present invention includes an electrode *within* the channel, is consistent with the above

interpretation. Electrode 5 is *within* the channel in the sense that it constitutes an electrode that is in the middle of the first channel defined by the series of electrodes in columns 1 and 2, and is also in the middle of the second channel defined by the series of electrodes in rows 1 and 2. Electrode 5 is therefore “within” the channel in the sense that it is between other electrodes in both a first direction and a second direction (i.e., it is in the middle of a two-dimensional array). In contrast, the cited prior art does not disclose a plurality of electrodes defining a two-dimensional array having one of the electrodes in a central location flanked by other electrodes in two different directions.

Accordingly, Applicant submits that the amended claims 24 and 29 now more particularly and clearly define subject matter that is distinguishable over the cited prior art references, and respectfully requests that the claims be allowed.

CONCLUSION

Independent claims 24 and 29, as amended, are believed to be in condition for allowance. The remaining dependent claims 25-26, 28, 30-31, and 34-37 are also believed to be in condition for allowance. Applicant respectfully request that all outstanding claims be allowed.

In the event that the examiner believes additional issues remain outstanding, he is encouraged to contact Applicants’ attorney at the telephone number provided below.

Respectfully submitted,

Christopher L. Wight
Reg. No. 31,680
Holland & Hart LLP
555 17th Street, Suite 3200
Denver, Colorado 80201-8749
Telephone: (801) 595-7823
Fax: (801) 364-9124

Date: January 19, 2006
CLW/jml